

### Claims

1. A method of assembling and operating a physical system from a remote location, such physical system having a plurality of structural elements and structural interconnections, such method comprising the steps of:
- 5     creating a graphical representation of the physical system at the remote location showing the elements and connections of the system to be assembled;
- 10     converting the graphical representation into an element list delineating the elements, interconnections, and configurable properties of the elements;
- transferring the element list from the remote location to an element controller; and
- 15     assembling and operating the system by the element controller in accordance with the element list.
2. The method of assembling and operating a physical structure of a system as in claim 1 wherein the step of
- 20     creating the graphical representation further comprises providing a graphical user interface with an assembly area for display of the graphical representation and a reference area for display of icons of structural elements, forcing functions and measurement instruments.
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3. The method of assembling and operating a physical structure of a system as in claim 2 further comprising dragging icons of elements from the reference area to the graphical representation in the assembly area.
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4. The method of assembling and operating a physical structure of a system as in claim 3 further comprising connecting the icons of the elements in the assembly area.



transferring a graphical representation of the system response to the remote location.

12. The method of assembling and operating a physical structure of a system as in claim 1 further comprising defining the element list as a netlist.

13. Apparatus for assembling and operating a physical system having a plurality of structural elements and structural interconnections from a remote location, the apparatus method comprising:

means for creating a graphical representation of the physical system at the remote location showing the elements and connections of the system to be assembled;

means for converting the graphical representation into an element list delineating the elements, the interconnections, and configurable properties of the elements;

means for transferring the element list from the remote location to an element controller; and

means for assembling and operating the system by the element controller in accordance with the element list.

14. The apparatus for assembling and operating a physical structure of a system as in claim 13 wherein the means for creating the graphical representation further comprises means for providing a graphical user interface with an assembly area for display of the graphical representation and a reference area for display of icons of structural elements, forcing functions and measurement instruments.

15. The apparatus for assembling and operating a physical structure of a system as in claim 14 further comprising means for dragging icons of system elements to the graphical representation in the assembly area.

16. The apparatus for assembling and operating a physical structure of a system as in claim 15 further comprising means for connecting the icons of the elements in the assembly area.

17. The apparatus for assembling and operating a physical structure of a system as in claim 13 further comprising means for spawning a task object within the element controller in response to receipt of the element list.

18. The apparatus for assembling and operating a physical structure of a system as in claim 17 further comprising means for composing the task object from a set of user-requested task elements.

19. The apparatus for assembling and operating a physical structure of a system as in claim 18 wherein a means for composing a modified task object from a set of available task elements further comprises means for validating the measurement elements against a set of instrument and structural element limitations.

20. The apparatus for assembling and operating a physical structure of a system as in claim 19 wherein the means for assembling the system further comprises means for closing a set of contacts within a matrix switch.

21. The apparatus for assembling and operating a physical structure of a system as in claim 20 wherein the means for operating the system further comprises means for connecting a forcing function to the assembled elements.

22. The apparatus for assembling and operating a physical structure of a system as in claim 21 further comprising means for recording a system response to the forcing function.

23. The apparatus for assembling and operating a physical structure of a system as in claim 22 further comprising means for transferring a graphical representation of the system response to the remote location.

24. Apparatus for assembling and operating a physical system having a plurality of structural elements and structural interconnections from a remote location, the apparatus method comprising:

a remote terminal adapted to create a graphical representation of the physical system at the remote location showing the elements and connections of the system to be assembled;

a conversion processor adapted to convert the graphical representation into an element list delineating the elements and the interconnections;

a communication processor adapted to transfer the element list from the remote location to an element controller; and

the element controller adapted to assemble and operate the system by the element controller in accordance with the element list.

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25. The apparatus for assembling and operating a physical structure of a system as in claim 24 wherein the remote terminal further comprises a graphical user interface adapted to provide an assembly area for display of the graphical representation and a reference area for display of icons of structural elements, forcing functions and measurement instruments.
26. The apparatus for assembling and operating a physical structure of a system as in claim 25 further comprising a pointer adapted to drag icons of system elements to the graphical representation in the assembly area.
27. The apparatus for assembling and operating a physical structure of a system as in claim 26 further comprising a connector routine adapted to connect the icons of the elements within the assembly area.
28. The apparatus for assembling and operating a physical structure of a system as in claim 27 further comprising a task object adapted to decompose the element list into a set of task elements.
29. The apparatus for assembling and operating a physical structure of a system as in claim 28 further comprising a forcing function adapted to load the physical system.

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